



Kewaunee Nuclear Power Plant
Operated by Nuclear Management Company, LLC

May 17, 2004

NRC-04-060
10 CFR 50.54(f)

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Kewaunee Nuclear Power Plant
Docket 50-305
License No. DPR-43

Supplement to 60-Day Response to Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors"

On June 9, 2003, the Nuclear Regulatory Commission (NRC) transmitted Bulletin (BL) 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors." By letter dated August 7, 2003, Nuclear Management Company, LLC (NMC) provided the 60-day response for the Kewaunee Nuclear Power Plant. In that response, the following commitment was made:

3. NMC will submit an implementation schedule for revising integrated plant emergency operating procedures, where appropriate, to stop or throttle redundant pumps that are not necessary to provide required flows to cool containment and the reactor core. NMC will submit this implementation schedule within 30 days of the issuance of the generic guidance by the Westinghouse Owners Group, currently expected by March 31, 2004.

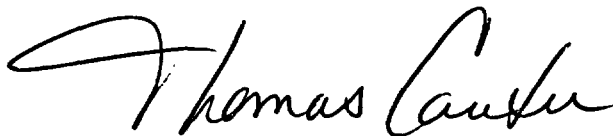
On April 16, 2004, the Westinghouse Owners Group (WOG) formally transmitted WCAP-16204, Revision 1, "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations." The WCAP evaluated 11 Candidate Operator Actions (COAs). Enclosure 1 provides the NMC response to each of the COAs and the implementation schedule for the Kewaunee Nuclear Power Plant. These COAs are interim measures that are being implemented while NMC conducts further evaluations. These interim measures, as well as the compensatory measures address in the response to BL 2003-01, will be re-evaluated during NMC's response to the upcoming Generic Letter on this issue.

Summary of Commitments

This letter contains five new commitments and no revisions to existing commitments.

1. NMC will evaluate and implement, as appropriate, COA #5 by November 30, 2005, at the Kewaunee Nuclear Power Plant.
2. NMC will evaluate and implement, as appropriate, COA #6, by November 30, 2005, at the Kewaunee Nuclear Power Plant.
3. NMC will evaluate and implement, as appropriate, COA #7 by February 28, 2005, at the Kewaunee Nuclear Power Plant.
4. NMC will evaluate and implement, as appropriate, COA #8 by November 30, 2005, at the Kewaunee Nuclear Power Plant.
5. NMC will evaluate and implement, as appropriate, COA #9 by November 30, 2005, at the Kewaunee Nuclear Power Plant.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 17, 2004.



Thomas Coutu
Site Vice President, Kewaunee Nuclear Power Plant
Nuclear Management Company, LLC

Enclosure (1)

cc: Administrator, Region III, USNRC
Project Manager, Kewaunee, USNRC
Resident Inspector, Kewaunee, USNRC

ENCLOSURE 1
**SUPPLEMENT TO 60-DAY RESPONSE TO BULLETIN 2003-01, "POTENTIAL IMPACT
OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT
PRESSURIZED-WATER REACTORS"**

Introduction

On April 16, 2004, the Westinghouse Owners Group (WOG) issued WCAP-16204, Revision 1, "Engineering Evaluation and Analysis Report, Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations." The WCAP provides an evaluation of potential changes to the Emergency Response Guideline (ERG) and the Emergency Procedure Guideline (EPG) as required by the Nuclear Regulatory Commission (NRC) Bulletin (BL) 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactor."

In the WCAP, the WOG evaluated 11 Candidate Operator Actions (COAs). This enclosure addresses each of the 11 COAs recommended in WCAP-16204, Revision 1. Information provided for each COA includes: the intent and strategy of the COA, the bases for implementing or not implementing the COA, and the implementation schedule for the COA.

WOG Recommended Candidate Operator Actions

COA #1: Secure one or both containment spray pumps before recirculation alignment.

The intent of this COA is to reduce the flow rate to the containment sump when containment recirculation begins, to reduce the pressure differential across the sump screens if there is a buildup of debris, and to provide a modest time delay to the start of containment recirculation during a small break loss of coolant accident (SBLOCA).

The overall strategy of this COA is to secure one or both containment spray pumps during the injection phase of the accident mitigation, based on containment pressure and other considerations such as radiation levels and sump pH.

Kewaunee's Integrated Plant Emergency Operating Procedure (IPEOP) for manual transfer to containment sump recirculation stops one Internal Containment Spray (ICS) pump prior to switching over to recirculation and maintains the second ICS pump taking a suction from the Refueling Water Storage Tank (RWST) until the tank level reaches 4%. Maintaining one ICS pump taking suction from the RWST ensures the required amount of sodium hydroxide is added to containment for proper pH control and scavenging iodine fission products from the containment atmosphere.

Once containment sump recirculation is established, ICS is not restarted unless certain criteria are met identifying a need to run a train of ICS. If ICS is

not required, the ICS system is placed in its standby alignment. If ICS is determined to be required, only one train is aligned in the containment sump recirculation mode.

Therefore, the current IPEOPs meet the intent of this COA.

Implementation Date: Not Applicable

COA #2: Manually initiate one train of containment sump recirculation earlier

The intent of this COA is to start containment sump recirculation while usable inventory remains available in the RWST, stop suction from the RWST to preserve this volume of water, and maintain one train of injection and spray pumps as a backup source.

The overall strategy of this action is to manually transfer the suction of one safety injection train to the containment sump prior to automatic transfer to recirculation, based on acceptable conditions.

Kewaunee does not have automatic initiation of containment sump recirculation. Kewaunee's IPEOPs direct the operator to manually swap over to containment sump recirculation when the RWST level reaches the appropriate level. With both Emergency Core Cooling System (ECCS) injection trains operating, when RWST level reaches 37%, one Residual Heat Removal (RHR) train is aligned to the containment sump and one RHR train remains taking suction from the RWST. Upon the RWST level reaching 4%, the RHR train taking suction from the RWST is stopped and aligned for containment sump recirculation standby. If only one ECCS injection train is operating, switchover of the operating train to containment sump recirculation is performed when RWST level is less than or equal to 10%. The idle train is aligned for containment recirculation standby when the RWST reaches 4%.

Kewaunee's sodium hydroxide standpipe is gravity fed and maintains approximately the same level as the RWST. If suction from the RWST were stopped earlier, the full complement of sodium hydroxide would not be added to containment as required. This introduces concerns with regards to scrubbing of iodine fission products, sump pH, loss of power or single failure concerns when recirculation is initiated sooner, and component cooling water heat removal capability due to potentially higher sump water temperature due to reduced sump inventory. Finally, to reduce the probability of sump screen blockage, it is desirable to have a higher sump level at the onset of recirculation to reduce transport velocities on the sump floor and immerse the sump screens as much as possible to provide more sump screen surface area.

Therefore, this COA will not be implemented for Kewaunee.

Alignment of the standby injection train to a refilled RWST will be evaluated as part of COA #6.

Implementation Date: Not Applicable

COA #3: Terminate one train of HPSI/high-head injection after recirculation alignment

The intent of this COA is to reduce the total flow through the sump screens to reduce the rate of debris transport, reduce the risk of screen blockage, reduce the risk of screen failure due to structural loading, preserve one train of safety injection by not subjecting it to damage by debris ingestion or loss of net positive suction head (NPSH), and to preserve one sump screen enclosure (applicability based on plant design).

The overall strategy of this COA is to secure one train of ECCS after both trains have been aligned for recirculation, based on acceptable conditions.

Kewaunee's IPEOPs contain steps to secure one train of Safety Injection (SI), RHR and ICS after containment sump recirculation has been established and the RWST level reaches 4%. As stated in COA #2 above, there are distinct advantages to injecting the entire usable RWST volume at the onset of a loss of coolant accident (LOCA).

When containment sump recirculation is established and ICS is not required, one full train of ECCS and ICS is aligned in standby, preserving one train of equipment, which also minimizes debris transport and reduces loading on the screens.

When ICS is required in the containment sump recirculation mode, the standby train of RHR is aligned to the containment sump to provide a suction source for the operating ICS pump. The same train Safety Injection pump is not started. Not starting the same train Safety Injection pump minimizes flow to the sump and reduces debris transport.

Kewaunee's current IPEOPs meet the intent of this COA.

Implementation Date: Not Applicable

COA #4: Terminate LPSI/RHR pump prior to recirculation alignment

WCAP-16204, Revision 1, indicates COA #4 was evaluated for Combustion Engineering designed plants. The intent of this COA is to delay ECCS suction switchover from the RWST to containment sump suction mode.

The overall strategy of this COA is to delay switchover to containment sump recirculation by securing one low-pressure safety injection (LPSI) pump prior to recirculation.

This COA is not applicable to Westinghouse pressurized water reactor plants operated by the Nuclear Management Company, LLC (NMC).

Implementation Date: Not Applicable

COA #5: Refill refueling water storage tank

The intent of this COA is to provide inventory for re-establishing reactor coolant system (RCS) injection and containment spray in the event the containment sump source is not available.

The overall strategy of this COA is to refill the RWST following initiation of recirculation or line up an alternate makeup source bypassing the RWST in anticipation of possible sump blockage.

Kewaunee's sodium hydroxide standpipe is gravity fed and maintains approximately the same level as the RWST. If RWST refill were initiated prior to injecting the full RWST volume, the full complement of sodium hydroxide would not be added to containment as required.

Currently, Kewaunee's IPEOPs initiate refilling the RWST upon a loss of containment sump recirculation.

Consideration will be given to adding a step in ES-1.3, Transfer to Containment Sump Recirculation, to initiate refilling the RWST after its contents are depleted. This COA will be evaluated in conjunction with COA #6, and will consider containment flooding, boron concentration and pH requirements.

Multiple methods for making up to the RWST will be evaluated and incorporated into the IPEOPs or supporting plant procedures as deemed appropriate.

The potential revisions to the IPEOPs or supporting plant procedures will require time to evaluate the issues, perform simulator validation if required, and include in the Licensed Operator training cycles.

Implementation Date: November 30, 2005

COA #6: Inject more than one RWST volume from refilled/diluted RWST or by bypassing RWST

The intent of this COA is to provide procedural guidance for re-establishing injection to the RCS from either the refilled RWST or an alternate makeup source.

The overall strategy of this COA is to secure recirculation and align equipment to re-establish injection from a refilled RWST or from an alternate source bypassing the RWST.

Currently, a graph displaying containment sump levels for specific injected water volumes exists in a Severe Accident Management Guideline (SAMG) calculational aid. The aid provides a listing of safety related components that may be affected at specified flood levels.

An evaluation will be performed to determine if a revision to the Emergency Plan Implementing Procedures (EPIP) used by the Technical Support Center should be made to address flooding concerns due to injecting more than one RWST volume.

An evaluation will also be performed to determine during containment sump recirculation the feasibility of aligning the standby injection train or another means of injection to a refilled RWST, or to an alternate source bypassing the RWST (see COA #2 and #5, above).

The potential revisions to the IPEOPs, supporting plant procedures, or EPIPs will require time to evaluate the issues, perform simulator validation if required, and incorporate into the Licensed Operator and Emergency Plan training cycles as appropriate.

Implementation Date: November 30, 2005

COA #7: Provide more aggressive cooldown and depressurization following a small break LOCA

The intent of this COA is to limit inventory loss during a SBLOCA by performing an aggressive cooldown of the RCS. Performing an aggressive cooldown may allow the operators to establish shutdown cooling in lieu of aligning for containment sump recirculation.

The overall strategy of this COA is to cooldown the plant as aggressively as possible, within Technical Specification limits, using IPEOPs and, if possible, establish shutdown cooling.

As recommended in WCAP-16204, Revision 1, a review will be conducted of Kewaunee IPEOPs to determine if wording changes are required in the IPEOPs or their background documents to stress the importance of

performing an aggressive cooldown, within Technical Specification limits, in response to a small break LOCA.

The potential revisions to the IPEOPs or supporting plant procedures will require time to evaluate the issues and include any resultant procedure revisions in the Licensed Operator training cycle.

Implementation Date: February 28, 2005

COA #8: Provide guidance on symptoms and identification of containment sump blockage

The intent of this COA is to provide procedural guidance on recognition of sump clogging.

The overall strategy of this COA is to continuously monitor system parameters for early detection of sump blockage.

Kewaunee does not have differential pressure indication across the containment sump screens.

Kewaunee's IPEOPs direct the operator to continuously monitor RHR pump motor current, discharge pressure, and RHR pump flow to identify a runout condition or cavitation. In the event these conditions occur, the procedure directs the operator to maintain minimum RCS injection flow, check valve alignment, and provides direction for throttling flow, as appropriate, through the RHR, SI or ICS systems.

An evaluation will also be conducted to determine if additional parameters should be included in the IPEOPs or supporting plant procedures for monitoring and identifying signs of sump blockage or debris ingestion.

The potential revisions to the IPEOPs or supporting plant procedures will require time to evaluate the issues, perform simulator validation if required, and include in the Licensed Operator training cycles.

Implementation Date: November 30, 2005

COA #9: Develop contingency actions in response to containment sump blockage, loss of suction, and cavitation

The intent of this COA is to provide guidance to respond to indications of sump blockage, loss of pump suction, and pump cavitation.

The overall strategy of this COA is to reduce recirculation flow, as allowed, to minimize head loss across the clogged screen and re-establish injection if recirculation is lost.

Contingency actions currently exist in Kewaunee's IPEOPs in response to RHR pump loss of suction or cavitation. The IPEOPs direct the operator to reduce flow through the RHR pumps while maintaining the minimum RCS injection flow rate, check valve alignment, and throttle flow, as appropriate, through the RHR, SI, or ICS systems using the valves designated in the procedure.

An evaluation will be performed to determine if the minimum RCS injection flow rates prescribed in the IPEOPs are optimum. If the flow rates can be lowered, it will result in decreased differential pressure across the containment sump screens and decreased transport velocities in the sump that can minimize debris transport to the screens.

Additionally, an evaluation will be conducted to review the actions recommended by COA #9 to determine if additional procedure guidance is required in response to containment sump blockage. This evaluation will include a review of the Sump Blockage Control Room Guideline for plant-specific applicability and possible conversion to a plant-specific procedure.

The potential revisions to the IPEOPs or supporting plant procedures will require time to evaluate the issues, perform simulator validation if required, and include in the Licensed Operator training cycles.

Implementation Date: November 30, 2005

COA #10: Terminate HPSI/high-head injection prior to recirculation alignment

WCAP-16204, Revision 1, indicates COA #10 was evaluated for Combustion Engineering designed plants. The intent of this COA was to delay the recirculation operation.

The strategy to accomplish this COA includes securing one high-head safety injection (HPSI) pump prior to recirculation by revising the HPSI stop/throttle criteria.

This COA is not applicable to Westinghouse pressurized water reactor plants operated by the Nuclear Management Company, LLC (NMC).

Implementation Date: Not Applicable

COA #11: Delay containment spray actuation for small break LOCA in ice condenser plants

WCAP-16204, Revision 1, indicates COA #11 was evaluated for ice condenser plants. The intent of this action is to prevent or delay containment spray for SBLOCAs less than one-inch diameter.

This COA is not applicable to pressurized water reactor plants operated by the Nuclear Management Company, LLC (NMC).

Implementation Date: Not Applicable

Conclusion

NMC has addressed each of the 11 COAs from WCAP-16204, Revision 1. These COAs are interim measures that will be evaluated and implemented, as appropriate, while NMC conducts evaluations to verify compliance with applicable regulatory requirements. These interim measures, as well as the compensatory measures addressed in the response to BL 2003-01, will be re-evaluated during NMC's response to the future Generic Letter on this issue.